

# **“A study on comparison of Minimal Separation Hydrocelectomy Vs. conventional Hydrocelectomy (Jaboulay’s procedure)” - At Govt. Kilpauk Medical College Hospital.”**

Prof. Dr. M. ALLI<sup>1</sup> Dr. A. SANTHI<sup>2</sup>  
Government Kilpauk Medical College, Chennai.

## **ABSTRACT**

To compare the new minimally access hydrocelectomy versus Jaboulay’s procedure regarding operative outcome and patient’s satisfaction. Minimal access hydrocelectomy surgery is a novel procedure and there is an adequate literature about the benefits of this surgical technique.

In India, still in many hospitals we are practicing only conventional hydrocelectomy (Jaboulay’s procedure) and Lord’s plication techniques for the treatment of hydrocele. These techniques have its own complications. Only a very few publications have studied the benefits of minimal access hydrocelectomy over the conventional procedure and there were no studies which involved Indian population.

*Materials and Methods:* A total of 60 adult patients were divided into two groups A and B. Group A patients was subjected to conventional surgical hydrocelectomy (Jaboulay’s procedure) and group B patients were subjected to the new minimal access hydrocelectomy. The primary endpoint of the study was recurrence defined as a clinically detectable characteristic swelling in the scrotum and diagnosed by the two surgeons and confirmed by ultrasound imaging study. The secondary endpoints were postoperative hematoma, wound sepsis and persistent edema and hardening.

*Conclusion:* Hydrocelectomy is considered the gold standard technique for the treatment of hydrocele and the minimally access maneuvers provide the best operative outcomes regarding scrotal edema and hardening and patient’s satisfaction when compared to conventional eversion-excision hydrocelectomies.

*Index Terms* - Minimally Invasive Surgical Procedures; complications [Subheading]; Testicular Hydrocele

## **INTRODUCTION**

Hydrocele is an abnormal collection of serous fluid in some part of the processus vaginalis, generally the tunica. Hydrocele is the most common benign swelling of the scrotum. The occurrences of hydrocele are estimated as 1% among the adult male population. “Primary vaginal hydrocele is well-defined as abnormal accumulation of serous fluid in tunica vaginalis.” Secondary hydrocele occur subordinate to disease of the testes and epididymis and its

management mainly comprises of treatment of the underlying cause. Filarial hydrocele and chylocoele account for 80% of hydrocele in some humid countries where the parasite, *Wuchereria Bancrofti*, is endemic.

Hydrocele is very common appearance in tropical countries especially where filariasis is dominant. In India the highest incidence is seen along the coastal belt where the filariasis is common. Aspiration and sclerotherapy with doxycycline are the main nonsurgical treatment option for the hydrocele. Aspiration and injection of sclerosant can cause severe pain, and simple aspiration has to be recurrent and carries risk of infection and hematoma formation. Hydrocelectomy remains the treatment of choice for the management of hydroceles. Surgery has been the normal and traditional treatment of choice for hydrocele and which is relatively simple and usually known.

Surgical treatment of idiopathic hydrocoele comprises basic techniques—Winkelmann’s partial excision, Lord’s plication and eversion of the sac. Jaboulay’s eversion of the sac and radical excision of the sac. Congenital hydrocoele is treated by herniotomy. The most common surgical procedures for the hydrocele are Lord’s plication and Jaboulay’s

procedure. The technique, devised by Lord and it may also apply to repair a hydrocele, and it is quick and relative bloodless since the sac is not dissected. These operations are minor surgical procedures and that can be performed in an out-patient setup with the success rate of 80% to 98%.

Hydrocelectomy through the eversion procedures for hydrocele may cause postoperative discomfort and temporary limitations of normal activities. The complications such as persistent swelling.

Complications arises in the following procedures include infection, hematoma formation, persistent swelling or recurrence of the hydrocele and chronic pain. Although hydrocelectomy and spermatocelectomy are done commonly in general urological practices, there is a definite insufficiency of knowledge describing the complication rates for these operations in the peer reviewed literature. Therefore we followed all the hydrocele surgeries done in our hospital to well capture of the incidence of complications following these procedures.

Since this information appears to be under this reported in the previous and current literature. However, now days there are few prospective studies comparing the results of the various surgical techniques.

## **AIM**

The aim of this thesis is to compare the operative outcomes among the primary vaginal hydrocele patients those underwent minimal access hydrocelectomy and conventional hydrocelectomy.

## **OBJECTIVES**

### **A. Primary**

The main objective of this thesis is to compare the post-operative complications among the primary vaginal hydrocele patients those underwent minimal access hydrocelectomy, conventional hydrocelectomy

### **B. Secondary**

To compare the operating time and hospital stay among the primary vaginal hydrocele patients those underwent minimal access hydrocelectomy and conventional hydrocelectomy.

## **PATIENTS AND METHODS**

This study includes 60 patients admitted in the Department of General Surgery, Kilpauk medical college during the period of 6 months for hydrocele needing elective surgery. The patients were chosen randomly. Out of these 60 patients, 30 were randomized to have Minimal Separation Hydrocelectomy and remaining 30 by conventional Hydrocelectomy were grouped as group A and group B respectively.

1. In the first group, Minimal Separation Hydrocelectomy technique

2. In the other group, conventional Hydrocelectomy (Jaboulay's procedure).

3. The patients were followed up for minimum 6 months directly. Patients who did not turn up for follow up were asked to notify the development of any complication through postal correspondence

4. Preoperatively all patients received

- Inj. ceftriaxone 1 gm i.v Stat.

5. Postoperatively all patients received

- Inj. Ceftriaxone 1 gm i.v bd
- All patient received analgesics.

6. All patients were operated either under spinal anaesthesia or epidural anaesthesia.

### **Sample size**

Sample size was determined based on

### **Study**

Comparative Study: A study on comparison of Minimal Separation Hydrocelectomy Vs. conventional Hydrocelectomy (Jaboulay's procedure)

### **Authored by**

Ku JH, Kim ME, Lee NK, Park YH

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In this study, the incidence of postoperative edema was 74% with conventional hydrocelectomy 8% in the minimal separation group difference of 66% reduction in the minimal separation group compared to conventional group ( $p < 0.001$ )

## Description:-

- $p\% = 66$  and  $q\% = 34$

$$n = p\% \times q\% \times [z/e\%]^2$$

$$n = 66 \times 34 \times [1.96/12]^2$$

$$n = 59.86 \text{ (rounded to 60)}$$

Therefore 60 is the minimum sample size required for the study assuming 80% as the power of study. In my study I plan to recruit a minimum of 60 subjects. 30 per intervention arm (2 arms – Minimal Separation Hydrocelectomy Vs. conventional Hydrocelectomy (Jaboulay's procedure). To arrive at a decrease in post op edema 8% at 66% (CI ranging from 58 to 74).

## Randomization

The randomization technique was commenced before the start of the procedure. There were 60 sealed envelopes made ready with sequential number from 1 to 60. Each envelope contained a computer generated random number inside in it.

Based on the last digit of the random number, the subjects were allocated to respective interventional group. If the number was between 0 and 4, they were assigned to conventional hydrocelectomy and if the number was between 5 to 9 and they were subjected to minimal separation hydrocelectomy.

The envelopes were opened by the investigator after getting the consent from the patient just prior to the surgery. Based on the random number, the subjects were allocated and the respective surgeries were done.

## Preoperative workup

Each patient was assessed in detail about their history and complete physical examination was done. Fluctuation and Trans-illumination was used for confirming the diagnosis of hydrocele. Basic laboratory investigations like complete blood count and urine routine examinations were done.

Inj.ceftriaxone 1gm IV at the time of induction of anaesthesia or just after the administration

of spinal anaesthesia was given followed by another dose 2 h postoperatively

## Surgical Techniques

After the induction of spinal anaesthesia, antibiotic ceftriaxone 1gm iv was given intravenously followed by one more dose 2 hours post-operatively.

### Conventional Hydrocelectomy (Jaboulay's Procedure)

The testis was delivered through an incision in the scrotum and the tunica was opened and everted and most of the hydrocele sac was resected with electrocautery and leaving a reasonable cuff along the borders of the testicle.

Bleeding was controlled by a running suture closing the free edges of the hydrocele sac and hemostasis was secured by the aid of electrocautery. Standard 2 layer closure which was used to close the scrotum with small tube drain. Patients were followed up on second day for scrotal edema and hematoma and the drain was removed on third day.

### Minimal Separation Hydrocelectomy

A small scrotal incision of about 2cm long was made and incision of the Dartos muscles in the same line was made using with electro cautery. The parietal tunica vaginalis (PTV) was identified grasped and minimal blunt dissection was made by the help of the index finger.

A small hole was made for the aspiration of hydrocele fluid. Then a disc of tissue was excised of the parietal tunica vaginalis about double of the skin incision dimension using electrocautery.

The edge of the visceral surface of the tunica vaginalis was sutured to the parietal layer of the tunica vaginalis and then to the Dartos muscle and all was sutured to scrotal skin in an everted manner aim to expose the visceral tunica toward scrotal skin. If the visceral surface of the tunica vaginalis is sutured to the Dartos, eversion will be created. Then when this everted structure is sutured to the scrotal skin, it will be in contact the sac with lymph-rich subcutaneous tissues.

A drain was kept in place and discharge was allowed for one day. Patients were followed up on

second day for scrotal edema and hematoma and the drain was removed on same day.

### **End Points**

The primary endpoint of the study was recurrence defined as a clinically detectable characteristic swelling in the scrotum and diagnosed by the two surgeons and confirmed by ultrasound imaging study. The secondary endpoints were postoperative hematoma, wound sepsis and persistent edema and hardening.

### **Conventional Hydrocelectomy (Jaboulay's Procedure) operative steps :-**

Vertical incision of about 6-8 cm in length was made over the scrotum, anteriorly about 1 cm lateral to the median raphe.



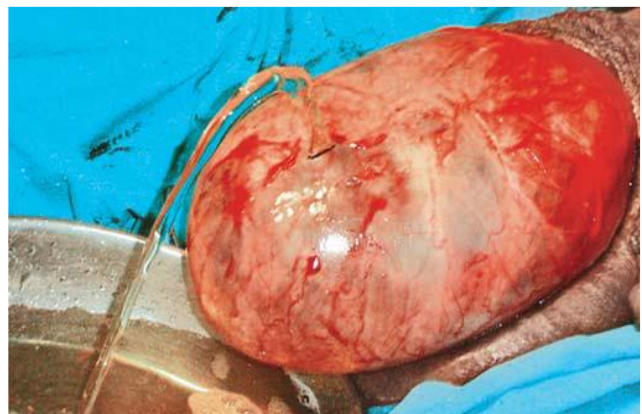
**Bluish hydrocele sac is identified parietal layer of the tunica vaginalis of testis**



**Hydrocele Sac Isolated and delivered out of scrotum totally**



**Fluid is evacuated using trocar and cannula. Sac is opened.**



**Partial excision and eversion of the sac behind the testis using absorbable suture material**



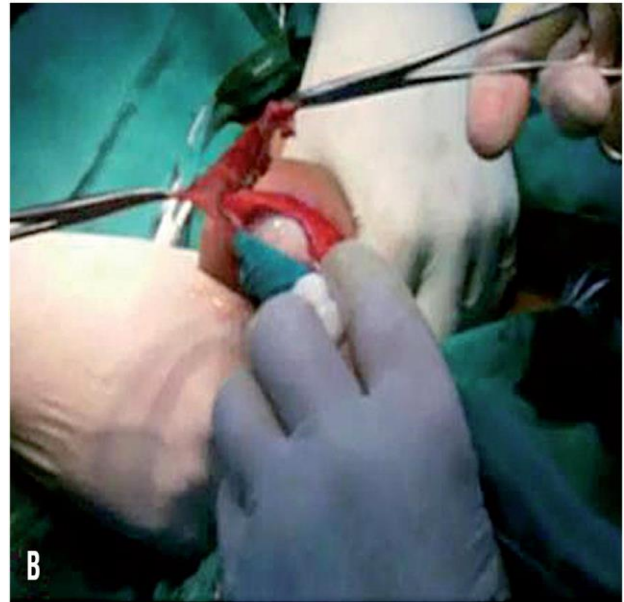


**Minimal Separation Hydrocelectomy operative procedures:-**

*Incision made over the scrotum of about 2cm in size deepened in layers.*



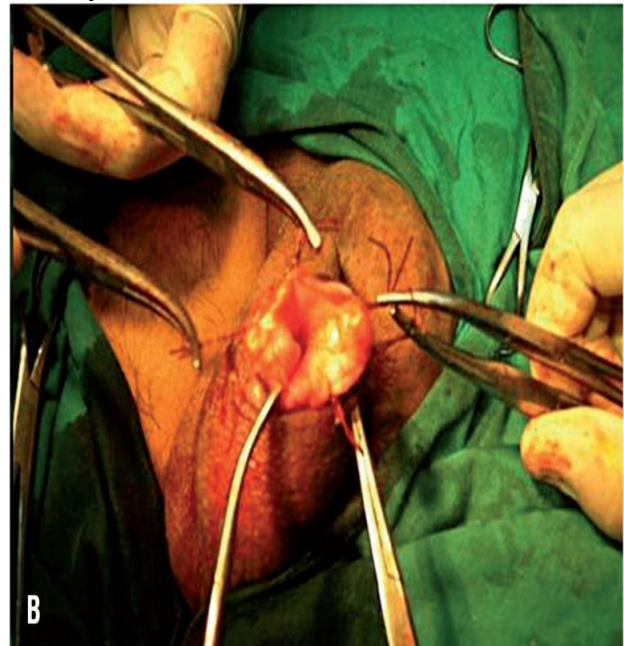
**In hydrocele sac disc of tissue was excised about double of the skin incision dimension using electro cautery**



**Evacuation of hydrocele fluid through a small hole made over the tunica vaginalis.**



**In hydrocele sac disc of tissue was excised about double of the skin incision dimension using electro cautery**



## **DATA ENTRY & ANALYSIS**

### **Data Entry**

The data collected from the questionnaires were entered in Microsoft Excel 2013 version and the master chart was framed. The data entered were double checked for any errors. The data from the master chart were exported to Statistical Package for Software Solutions (SPSS) version 21 for analysis. Totally data was collected from 60 patients with 30 from each arm.

### **Data Analysis**

Continuous variables were presented in the form of descriptive statistics (mean and standard deviation) and categorical variables in the form of frequency distributions and percentages. Association between categorical variables is tested using Chi square tests and Fisher exact tests. Association between continuous variables and a grouping variable were tested using student 't' test.

### **Data presentation**

The distribution of categorical data in the total study & among rural and urban population were represented by tables and bar charts. The continuous variables distribution were depicted by tables, box plot and error bar chart. The distribution of continuous variables along a grouping variable with a linear trend is represented by line diagrams.

## **RESULTS**

Considering the baseline characteristics, there was no significant difference between the two groups.

The distribution of participants in the both groups of the study population in different age categories was almost nearly equal with no much difference. The difference in the distribution of study participants in the both groups was statistically insignificant.

The presentation of symptoms of the patients is almost equal in both groups of the study population and the difference in the distribution is statistically insignificant.

The presentation of side of hydrocele of patients in the both groups had no much difference

with right side more common followed by left side and a few by both sides. The difference in the distribution is statistically insignificant.

The mean duration of hydrocele of patients in the both groups of the study population had only a mild difference which was not statistically significant. The range of duration of hydrocele was 16 years (1 to 17 years) in both the study groups. 93% of the patients presented with oedema and hardening out of which 33% also presented with wound infection and 3% also presented with hematoma. Only 7% had no post-operative complications.

Only 10% of the study participants underwent minimal separation hydrocelectomy presented with oedema and hardening and only 7% presented with wound infection. 83% of the patients didn't experience any post-operative complications.

Edema and hardening was the most common complication and is more incident in patients who underwent conventional hydrocelectomy. The difference in the distribution of edema and hardening among the patients in the two study groups was statistically significant.

Taking into account, the overall post-operative complications suffered by the patients in both groups of the study population, the conventional hydrocelectomy group had more incidences of post-operative complications. Around 67% of the patients belonged to conventional hydrocelectomy group of the study population suffered complications whereas only 17% of the patients belonged to minimal separation hydrocelectomy group suffered complications.

The difference in the distribution of operative time of the patients underwent two different surgical procedures were statistically significant with higher mean operating time in conventional hydrocelectomy than minimal separation hydrocelectomy.

The difference in the distribution of time of hospital stay of the patients underwent two different surgical procedures was statistically significant with higher mean time of hospital stay in conventional hydrocelectomy than minimal separation hydrocelectomy.

## **DISCUSSION**

The mean age of the participants in the study population was  $47.7 \pm 14.15$  years with a

minimum of 21 years to a maximum of 80 years. This age distribution was almost close to the Saber study which was included participants from 18 to 56 years with a mean of  $37 \pm 11.4$  years.

Similarly in Saber study, the operating time for conventional hydrocelectomy was slightly higher with mean of  $32.5 \pm 4.76$  minutes upto a maximum of 40 minutes and the operating time for minimal access hydrocelectomy was slightly lower with mean of  $15.1 \pm 4.24$  minutes with a range of 12 to 18 minutes. The difference in mean operating time between the two procedures was statistically significant ( $p < 0.02$ ).

The hospital stay among the patients who underwent conventional hydrocelectomy was  $80.5 \pm 13.45$  hours with a range of 48 to 98 hours and those who underwent Minimal access hydrocelectomy was  $48.57 \pm 21.19$  hours with a range of 25 to 95 hours.

The difference in the mean time between the two surgical procedures was statistically significant ( $p < 0.01$ ). In Saber study, the mean time of hospital stay for conventional hydrocelectomy was lower with mean of  $21.19 \pm 11.65$  hours with a range of 12 to 48 hours and the mean time of hospital stay for minimal access hydrocelectomy was lower with mean of  $13.48 \pm 6.38$  hours with a range of 10 to 30 hours. But the difference in the above mean time of hospital stay between two procedures was not statistically significant ( $p > 0.05$ ). This could be attributed to the geographical differences in the protocol management of the cases in the hospital. The differences may be due to available resources and sufficient health care providers.

This difference in the distribution was also statistically significant. This is additive to the evidence produced by Saber study which also showed a significant difference in the distribution of edema and hardening among the patients between conventional hydrocelectomy (25%) and minimal access hydrocelectomy (5%).

The next common complication following hydrocelectomy is hematoma over the surgical site. Only 3% of the patients who underwent conventional hydrocelectomy had incidence of hematoma whereas there was no incidence of hematoma in patients underwent minimal separation hydrocelectomy. In the Saber study also there was zero incidence of the hematoma in patients who underwent minimal access hydrocelectomy.

Oedema and hematoma are the most common in excision and eversion technique (conventional hydrocelectomy). This is because of wide

dissection and excessive handling of the hydrocele sac during the surgery. In the minimal separation hydrocelectomy a disc of the hydrocele sac is pulled and resected through a small scrotal incision with minimal dissection. The other complications following hydrocelectomy are wound infection which is very negligent among both groups of patients.

### LIMITATIONS

- Due to availability of limited resources, the trial was single blinded and so there would have been a few chances of interviewer bias. If the study was done double or triple blinded, the results would have been much better.
- Due to availability of limited resources, the patients were followed up for only up to the post-operative period of hospital stay only. So that long term complications could not be evaluated.

### CONCLUSION

1. The overall complication rate among patients underwent minimal access hydrocelectomy (17%) is very less compared to conventional hydrocelectomy (67%).
2. The operating time of hydrocelectomy was around 13 minutes significantly lesser in minimal access hydrocelectomy ( $17.93 \pm 1.28$  minutes) compared to conventional hydrocelectomy ( $30.83 \pm 2.9$  minutes).
3. The patients underwent minimal access hydrocelectomy ( $48.57 \pm 21.19$  hours) had a significantly lesser hospital stay of around 32 hours compared to conventional hydrocelectomy ( $80.5 \pm 13.45$  hours).

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